

WHAT IS CLAIMED IS:

1. A process for recycling a vapor-phase chemical comprising:
5 introducing vapor-phase chemicals into a reactor with sufficiently supplied energy
to cause a reaction in said reactor;
exhausting gases from said reactor resulting from said reaction;
separating a first gas from said exhausted gases;
purifying said first gas; and thereafter
10 introducing said first gas into said reactor.
2. The process of Claim 1, wherein said reaction comprises depositing a thin
film layer on a substrate positioned in said reactor.
- 15 3. The process of Claim 1, wherein said first gas comprises H₂.
4. The process of Claim 1, wherein said vapor-phase chemicals comprise H₂.
5. The process of Claim 4, wherein said first gas comprises between 80% to
20 90% of the quantity of said H₂ introduced in said reactor.
6. The process of Claim 1, wherein the sufficient supplied energy comprises
an RF low frequency power energy level of between about 0.318 watts/cm² to about
3.18 watts/cm².
- 25 7. The process of Claim 1, wherein said reactor comprises a tapered outer
shell surrounding a tapered susceptor.
8. A process for recycling a gas used in semiconductor processing
30 applications, said process comprising:
introducing H₂ into a semiconductor reactor;

exhausting at least a portion of said H_2 from said reactor;
purifying said exhausted H_2 ; and thereafter
introducing said purified H_2 into said semiconductor reactor.

5 9. The process of Claim 8, further comprising introducing vapor-phase
chemicals into a reactor with sufficiently supplied energy to cause a reaction in
said reactor.

10 10. The process of Claim 8, wherein said purified H_2 comprises between 80%
to 90% of the quantity of said H_2 introduced in said reactor.

15 11. A system for recycling a vapor phase chemical, said system comprising:
a reactor chamber capable of receiving and exhausting vapor-phase chemicals;
a gas scrubber capable of receiving vapor-phase chemicals exhausted from said
reactor chamber and outputting a first gas; and
a gas purifier capable of purifying said first gas, said purified first gas being
returnable to said reactor chamber.

20 12. The system of Claim 11, wherein said reactor chamber is a
PECVD reactor.

13. The system of Claim 11, wherein said first gas comprises H_2 .

25 14. The system of Claim 11, wherein said purified first gas comprises H_2
comprising between 80% to 90% of the quantity of said H_2 introduced in said reactor.

15. The system of Claim 11, further comprising a pump for pumping said first
gas through said system.